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COMPLETED

FLOOD INSURANCE STUDY

ORIGINAL

CITY OF BURNET, TEXAS
BURNET COUNTY

SEPTEMBER 18, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 480092

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
CITY OF BURNET, BURNET COUNTY, TEXAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Burnet, Burnet County, Texas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the Fort Worth District of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-1153, Project Order No. 1, and Amendment No. 24. This work was completed in July 1985.

1.3 Coordination

On July 26, 1983, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the City of Burnet, the COE (the study contractor), the Texas Department of Water Resources, and the Lower Colorado River Authority to determine the streams to be studied by detailed methods.

The following agencies were contacted for information pertinent to this study: the U. S. Geological Survey (USGS); the Soil Conservation Service (SCS); Greenhorne & O'Mara, Inc.; Dewberry & Davis; the Texas Department of Water Resources; the City of Burnet; and the Texas Department of Highways and Public Transportation.

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On September 8, 1986, a final CCO meeting was held with representatives from FEMA and the city to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Burnet, Burnet County, Texas. Portions of Burnet County are located within the City of Burnet but are not included in this study. The area of study is shown on the Vicinity Map (Figure 1).

The following flooding sources were studied by detailed methods: Hamilton Creek for its entire length within the corporate limits; Haynie Branch from its confluence with Hamilton Creek to a point approximately 300 feet downstream of the corporate limits; Stream HC(B)-2 from its confluence with Hamilton Creek to a point approximately 125 feet downstream of the corporate limits; Daugherty Branch for its entire length within the corporate limits; and Stream HC(B)-3 for its entire length within the corporate limits. The reservoir above SCS Dam #1 was also studied by detailed methods. In addition, the emergency spillway for SCS Dam #1 was studied by detailed methods and has been identified as a shallow flooding area. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through July 1990.

The remaining portions of Haynie Branch, Stream HC(B)-2, three tributaries to Daugherty Branch, four tributaries to Hamilton Creek, and Stream HC(B)-1 were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Burnet.

2.2 Community Description

The City of Burnet is the county seat for Burnet County and is located in the central part of Texas. It is also located in the central part of the county and is completely bordered by the county. Austin, the capital of Texas, is approximately 50 miles southeast of the City of Burnet. The land area contained within the corporate boundaries is approximately 2,700 acres. The population of the community was 3,410 in 1980 (References 1 and 2).

Climatological data gathered in Austin, Texas were considered indicative of the conditions prevailing in the region. Average annual rainfall during the past 40 years was 33.34 inches. The maximum and minimum

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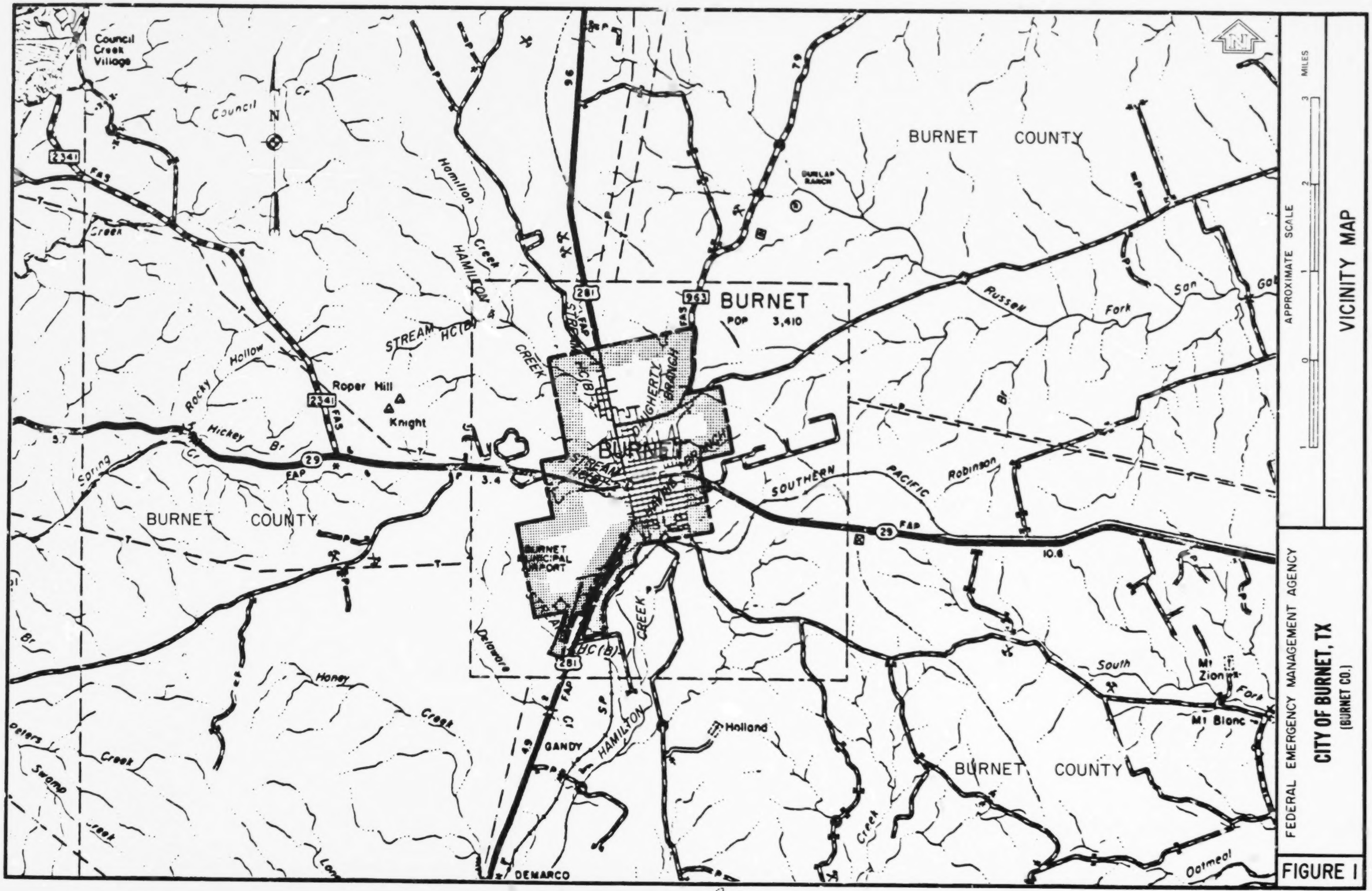

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annual rainfall during that period was 51.30 inches in 1957 and 11.42 inches in 1954, respectively. The mean relative humidity is 69 percent, and the average temperature is 68 degrees Fahrenheit (Reference 3).

Hamilton Creek flows south through the western part of the city. It has a drainage area of approximately 22.6 square miles at the confluence of the Delaware Creek, and approximately 3.2 miles of this creek lies within the city.

Haynie Branch flows southwest through the eastern and southern parts of the city into Hamilton Creek. It has a drainage area of approximately 1 square mile and is approximately 2.1 miles long.

Stream HC(B)-2 is a tributary of Hamilton Creek and is located in the west central part of the city. It has a drainage of approximately 0.5 square mile and is approximately 1 mile long.

Daugherty Branch flows south through the north central part of the city into Hamilton Creek. It has a drainage area of approximately 2.5 square miles and is approximately 2.2 miles long.

Stream HC(B)-3 flows into the northwestern part of the city where it joins Hamilton Creek. It has a drainage area of approximately 1 square mile, and approximately 0.5 mile lies within the city.

2.3 Principal Flood Problems

Heavy rainfall from storms along weather fronts are the major cause of flooding, primarily during the spring and summer months. Major flooding can be produced by intense rainfall usually associated with localized thunderstorms. These thunderstorms may occur at any time during the year but are more prevalent in the spring and summer months.

On November 5, 1974, one such storm occured on the Hamilton Creek watershed. This storm caused estimated damages of $50,000 and had a frequency of the 5-year flood event. These estimates were calculated by the SCS.

2.4 Flood Protection Measures

The SCS is constructing three dams. Two of the dams will be outside the city. SCS Dam #1 lies within the city on Daugherty Branch and is currently under construction. SCS Dam #2 lies outside the corporate limits on Hamilton Creek and is also currently under contsruction. SCS Dam #3, which is located outside of the corporate limits, is under construction on Stream HC(B)-4.

Nonstructural measures of flood protection in the form of land use regulations are being used to aid in the prevention of future flood damages.

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3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for each flooding source studied in detail affecting the community.

The computer program NUDALLAS was used in developing the hydrology for the streams studied by detailed methods (Reference 4). The watershed was divided into subbasins, and synthetic unit and flood hydrographs were developed at selected locations. National Weather Service Technical Paper No. 40 and National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NWS Hydro-35 were used in developing the 10-, 50-, and 100-year frequency storms (References 5 and 6). The 500-year storm was based on extrapolated data. Peak discharge-frequency values were computed for selected locations. Routing of the flood hydrographs through each subbasin reach, including the reservoir above SCS Dam #1, was accomplished using a modified PULS reservoir routing procedure. The HEC-2 backwater model provided the elevation-discharge-storage relationships for each reach on all streams studied by detailed methods and for the reservoir above Dam #1 (Reference 7). There are no stream gages to calibrate the hydrology on any of the streams studied.

A summary of drainage area-peak discharge relationships for the streams studied are shown in Table 1, "Summary of Discharges." Discharges for Hamilton Creek and Daugherty Branch (below SCS Dam #1) decrease going downstream due to effects of storage.

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TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
HAMILTON CREEK					
Upstream of confluence of stream HC(B)-1	16.56	8,300	12,?20	14,400	17,570
Downstream of confluence of Haynie Branch	13.73	8,800	12,420	14,350	17,090
Upstream of confluence of Haynie Branch	12.72	7,910	11,210	12,970	15,480
Downstream of confluence of Stream HC(B)-2	12.17	7,860	11,060	12,760	15,220
Upstream of confluence of Daugherty Branch	9.09	6,850	9,600	11,080	13,000
Downstream of confluence of right bank tributary located approximately 1,600 feet upstream of confluence of Daugherty Branch	9.01	6,800	9,570	11,100	13,090
Upstream of confluence of right bank tributary located approximately 1,600 feet upstream of confluence of Daugherty Branch	8.71	6,640	9,280	10,680	12,590
Downstream of confluence of Stream HC(B)-3	8.22	6,740	9,340	10,670	12,390
Upstream of confluence of Stream HC(B)-3	7.25	5,610	7,800	8,920	10,380
Upstream of confluence of right bank tributary located approximately 900 feet upstream of confluence of Stream HC(B)-3	6.21	4,430	6,190	7,070	8,240
HAYNIE BRANCH					
At confluence with Hamilton Creek	1.01	1,540	2,210	2,290	2,740
At State 29 (Polk Street)	0.54	1,030	1,410	1,570	1,810
Approximately 1,600 feet downstream of the eastern corporate limits	0.23	590	770	850	1,030

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
STREAM HC(B)-2					
At confluence with Hamilton Creek	0.53	960	1,280	1,440	1,650
Approximately 500 feet downstream of the northwestern corporate limits	0.26	630	820	910	1,090
DAUGHERTY BRANCH					
At confluence with Hamilton Creek	2.54	1,160	1,570	1,770	2,020
At Wood Street	2.26	860	1,150	1,290	1,490
At FM 983 (Grave Street)	1.90	500	660	750	850
Outflow from SCS Dam #1	1.75	100	120	355	820
Inflow to SCS Dam #1	1.75	2,910	3,910	4,370	4,960
Downstream of confluence of left bank tributary located approximately 1,300 feet upstream of SCS Dam #1	1.16	1,850	2,490	2,790	3,170
Upstream of confluence of left bank tributary located approximately 1,300 feet upstream of SCS Dam #1	0.76	1,190	1,600	1,790	2,030
STREAM HC(B)-3					
At confluence with Hamilton Creek	0.97	1,420	1,920	2,170	2,470
At Old San Saba Road	0.64	970	1,300	1,460	1,660

SCS Dam #1 was included in the hydrologic analysis mentioned above. The hydrologic analysis of this dam reflects the stillwater elevations and do not include the contributions from wave action affects.

The stillwater elevations for the 10-, 50-, 100-, and 500-year floods have been determined for SCS Dam #1 and are summarized in Table 2.

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TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
RESERVOIR ABOVE SCS DAM #1 for its entire shoreline within community	1,336.1	1,339.1	1,340.3	1,341.6

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the backwater analyses were obtained using digitized aerial photographs at a scale of 1:9,600 with a contour interval of 4 feet (Reference 8). The cross sections are located near the upstream and downstream edges of structures in order to compute any significant head losses caused by these structures. In addition, a few cross sections were field surveyed in February 1973 and September 1979. Bridge data were obtained by: field measurements; bridge plans from the Texas Department of Highways and Public Transportation; and by digitization from aerial photographs.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 7). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the streams studied by detailed methods were calculated using the slope/area method. The starting water-surface elevation for Daugherty Branch above SCS Dam #1 uses a known value taken from the modified PULS reservoir routing procedure.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and flood plain areas. The following is a tabulation of roughness factors used in the hydraulic analyses:

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Stream	Channel "n"	Overbank "n"
Hamilton Creek	.040-.065	.055-.085
Haynie Branch	.045-.065	.065-.080
Stream HC(B)-2	.060-.065	.055-.080
Daugherty Branch	.045-.050	.060-.070
Stream HC(B)-3	.050-.060	.065-.080

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year flood plain boundaries and 100-year floodway to assist communities in developing flood plain management measures.

4.1 Flood Plain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:9,600 with a contour interval of 4 feet (Reference 8). The shallow flooding was delineated along the emergency spillway for SCS Dam #1 using known dimensions of the structure.

Flood boundaries for the reservoir above SCS Dam #1 were delineated using the maps referenced above (Reference 8).

For the streams studied by approximate methods, the 100-year flood was delineated using the Flood Hazard Boundary Map for the City of Burnet (Reference 9). Approximate flood boundaries were also estimated using typical depths and widths from area streams and known flood depths and widths from past flood experience if the data were available.

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The 100- and 500-year flood plain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AO), and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year flood plain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the flood plain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 3). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary is shown. A floodway has been determined for the emergency spillway for SCS Dam #1, which has been identified as a shallow flooding area, for administrative purposes.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Hamilton Creek								
A	1,980[1]	600	2,990	4.8	1,249.8	1,249.8	1,250.7	0.9
B	3,370[1]	440	3,719	3.9	1,255.6	1,255.6	1,256.5	0.9
C	4,350[1]	250	2,144	6.0	1,259.6	1,259.6	1,260.1	0.5
D	5,010[1]	260	2,461	5.3	1,265.2	1,265.2	1,265.5	0.3
E	5,630[1]	260	2,304	5.6	1,266.0	1,266.0	1,266.6	0.6
F	6,820[1]	220	1,611	8.1	1,271.8	1,271.8	1,272.3	0.5
G	7,650[1]	330	1,929	6.6	1,279.9	1,279.9	1,280.1	0.2
H	8,320[1]	880	4,042	3.2	1,282.5	1,282.5	1,282.9	0.4
I	9,510[1]	260	1,546	7.2	1,285.9	1,285.9	1,286.3	0.4
J	10,570[1]	240	1,672	6.4	1,289.9	1,289.9	1,290.6	0.7
K	12,330[1]	350	1,361	7.8	1,297.2	1,297.2	1,297.6	0.4
L	12,910[1]	400	2,362	4.5	1,300.0	1,300.0	1,300.9	0.9
M	14,130[1]	270	1,741	6.1	1,307.5	1,307.5	1,308.3	0.8
N	15,420[1]	260	1,896	5.6	1,315.3	1,315.3	1,315.6	0.3
O	16,480[1]	260	1,911	4.7	1,318.6	1,318.6	1,319.4	0.8
P	17,050[1]	350	1,918	4.7	1,321.1	1,321.1	1,321.7	0.6
Q	17,510[1]	300	1,086	6.5	1,324.0	1,324.0	1,324.1	0.1
Haynie Branch								
A	1,400[2]	100	429	5.6	1,259.2	1,259.2	1,259.7	0.5
B	2,630[2]	110	492	4.9	1,269.0	1,269.0	1,269.8	0.8
C	3,430[2]	120	530	4.5	1,276.9	1,276.9	1,277.7	0.8
D	3,980[2]	180	538	4.4	1,281.6	1,281.6	1,282.6	1.0

[1]Feet above Southern Pacific Railroad

[2]Feet above confluence with Hamilton Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX

(BURNET CO.)

FLOODWAY DATA

HAMILTON CREEK - HAYNIE BRANCH

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Haynie Branch (continued)								
E	4,530	170	468	5.1	1,288.1	1,288.1	1,288.5	0.4
F	5,060	150	410	3.8	1,294.0	1,294.0	1,294.8	0.8
G	5,390	110	380	4.1	1,296.0	1,296.0	1,296.8	0.8
H	5,890	143	273	5.7	1,300.1	1,300.1	1,300.3	0.2
I	6,360	100	463	3.4	1,306.5	1,306.5	1,307.4	0.9
J	7,180	100	275	5.7	1,319.8	1,319.8	1,320.3	0.5
K	7,990	109	250	6.3	1,331.8	1,331.8	1,332.2	0.4
L	8,920	96	130	6.5	1,350.8	1,350.8	1,350.9	0.1
M	9,420	68	125	6.8	1,363.0	1,363.0	1,363.4	0.4
N	10,170	60	141	6.0	1,385.1	1,385.1	1,385.2	0.1
Stream HC(B)-2								
A	1,380	220	436	3.3	1,285.5	1,285.2[2]	1,286.2	1.0
B	2,160	150	353	4.1	1,293.4	1,293.4	1,293.8	0.4
C	2,770	101	210	6.8	1,299.4	1,299.4	1,299.4	0.0
D	3,830	135	255	3.6	1,306.0	1,306.0	1,306.4	0.4
E	4,260	120	218	4.2	1,311.5	1,311.5	1,312.4	0.9
F	4,770	101	205	4.4	1,320.8	1,320.8	1,321.2	0.4

[1]Feet above confluence with Hamilton Creek

[2]Elevation computed without consideration of backwater effects from Hamilton Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX

(BURNET CO.)

FLOODWAY DATA

HAYNIE BRANCH - STREAM HC (B) -2

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Daugherty Branch								
A	840	58	222	8.0	1,283.9	1,283.9	1,283.9	0.0
B	1,480	80	352	5.[illegible]	1,289.4	1,289.4	1,289.6	0.2
C	2,020	150	541	3.3	1,291.5	1,291.5	1,292.5	1.0
D	2,300	140	529	3.3	1,293.5	1,293.5	1,294.0	0.5
E	2,710	150	489	3.6	1,295.5	1,295.5	1,295.7	0.2
F	2,950	100	320	4.0	1,296.5	1,296.5	1,296.7	0.2
G	3,720	100	320	4.0	1,301.3	1,301.3	1,301.4	0.1
H	4,070	100	411	3.[illegible]	1,302.1	1,302.1	1,302.6	0.5
I	4,470	101	175	4.3	1,303.2	1,303.2	1,303.5	0.3
J	9,680	100	309	5.8	1,344.9	1,344.9	1,344.9	0.0
K	10,600	99	315	5.7	1,352.3	1,352.3	1,352.6	0.3
Stream HC(B)-3								
A	650	180	441	4.9	1,318.1	1,318.1	1,318.4	0.3
B	1,750	120	343	6.3	1,326.4	1,326.4	1,326.6	0.2

[1]Feet above confluence with Hamilton Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX

(BURNET CO.)

FLOODWAY DATA

DAUGHERTY BRANCH - STREAM HC (B)-3

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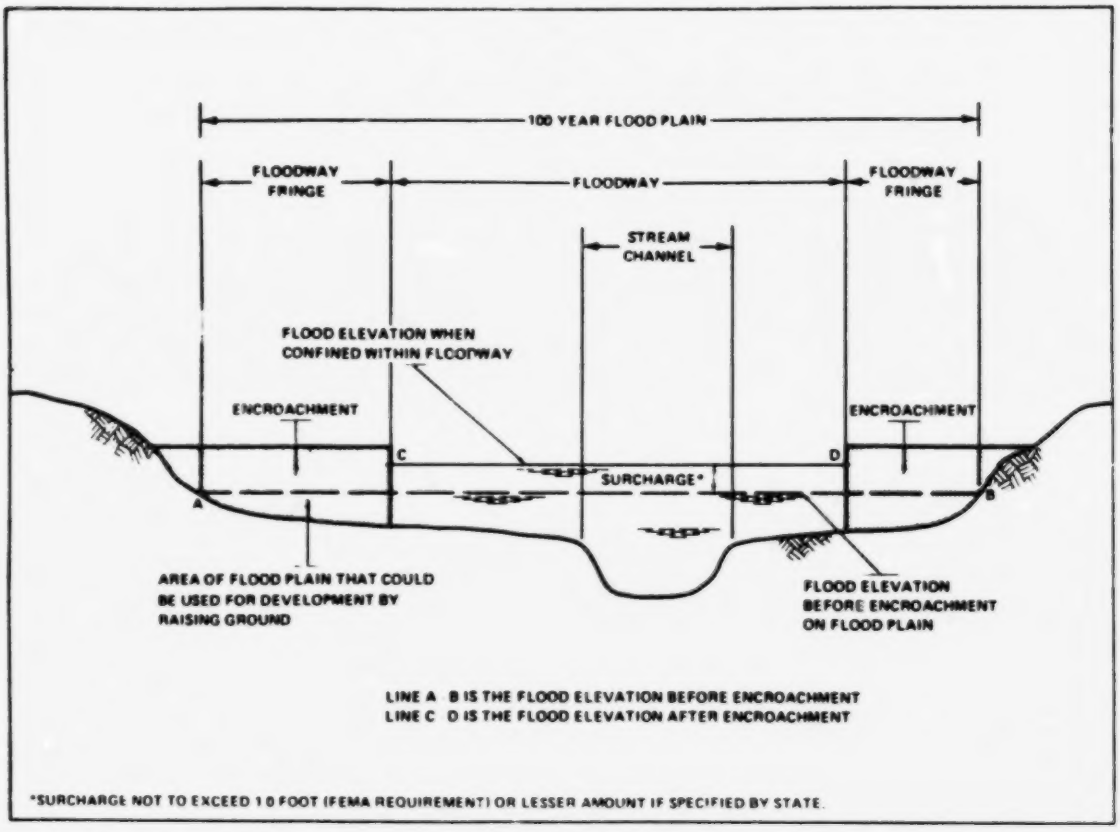
the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body Therefore, "Without Floodway" elevations presented in Table 3 for certain downstream cross sections of Stream HC(B)-2 are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

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Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year flood plains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year flood plain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

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Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal flood plains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year flood plain, areas within the 500-year flood plain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and flood plain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year flood plains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For flood plain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year flood plains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

Due to a more detailed analysis, this study supersedes the Flood Hazard Boundary Map for the City of Burnet (Reference 9).

The SCS published the following study on the City of Burnet, Texas: Final Watershed Plan and Environmental Impact Statement USDA-SCS-EIS-WS-(ADM)-78-5-(F)-(TX) Hamilton Creek Watershed, Burnet County, Texas (Reference 10).

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8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Federal Regional Center, 800 North Loop 288, Denton, Texas 76201.

9.0 BIBLIOGRAPHY AND REFERENCES

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3. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Monthly and Annual Climatological Data for Texas State, Asheville, North Carolina, National Climatic Center, Published Annually.

4. U. S. Army Corps of Engineers, Fort Worth District, Computer Program NUDALLAS, Fort Worth, Texas, revised September 1982.

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7. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Computer Program 723-X6-L2024, Davis, California, January 1981, with updates.

8. International Aerial Mapping Co., of San Antonio, Texas, prepared for U. S. Army Corps of Engineers, Fort Worth District, Topographic maps compiled from aerial photographs, Scale 1:9,600, Contour Interval 4 Feet: Burnet, Texas, January 1984.

9. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Burnet, Burnet County, Texas, January 30, 1976.

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10. U. S. Department of Agriculture, Soil Conservation Service, Final Watershed Plan and Environmental Impact Statement USDA-SCS-EIS-WS-(ADM)-78-5-(F)-(TX) Hamilton Creek Watershed, Burnet County, Texas, Washington, D. C., February 1979.

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EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
*RM 1	01	1,340.08	Cap stamped TBM 210 1984 on top of iron rod, located on southwest corner of T-intersection of private farm road and Old San Saba Road, approximately 0.3 mile north of intersection of Old San Saba Road and Water Street (U. S. Route 281).
RM 2	01	1,265.10	Cap stamped TBM 207 1984 on top of iron rod, located on southeast side of T-intersection of Water Street (U. S. Route 281) and Pecan Street.
RM 3	01	1,266.70	Cap stamped TBM 206 1984 on top of iron rod, located on southwest side of T-intersection of Water Street (U. S. Route 281) and paved road that is entrance to Burnet rodeo grounds (near Burnet airport).

*Located outside corporate limits - not shown on map

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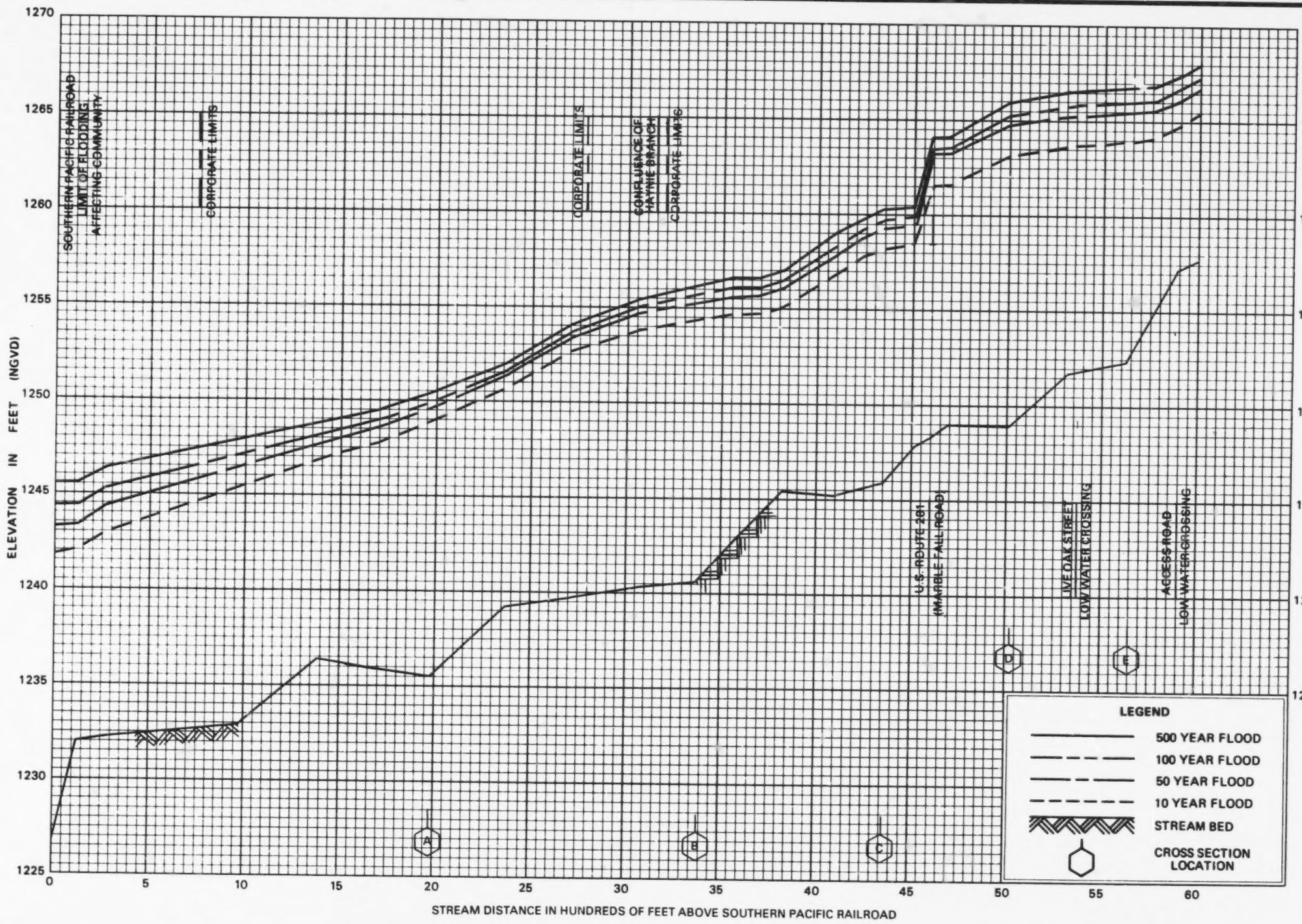

FLOOD PROFILES

HAMILTON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX
(BURNET CO.)

01P

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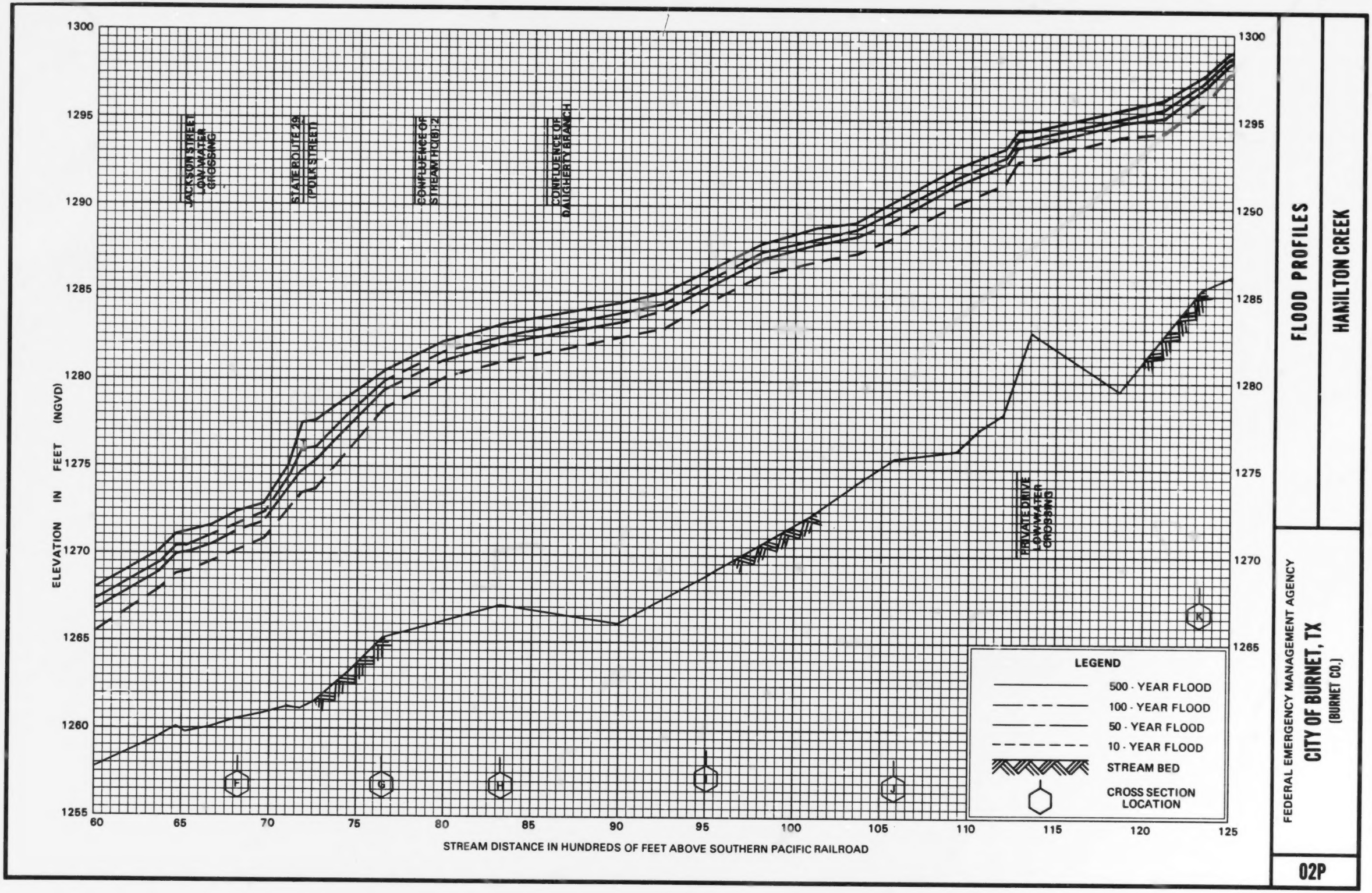

FLOOD PROFILES

HAMILTON CREEK

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CITY OF BURNET, TX

(BURNET CO.)

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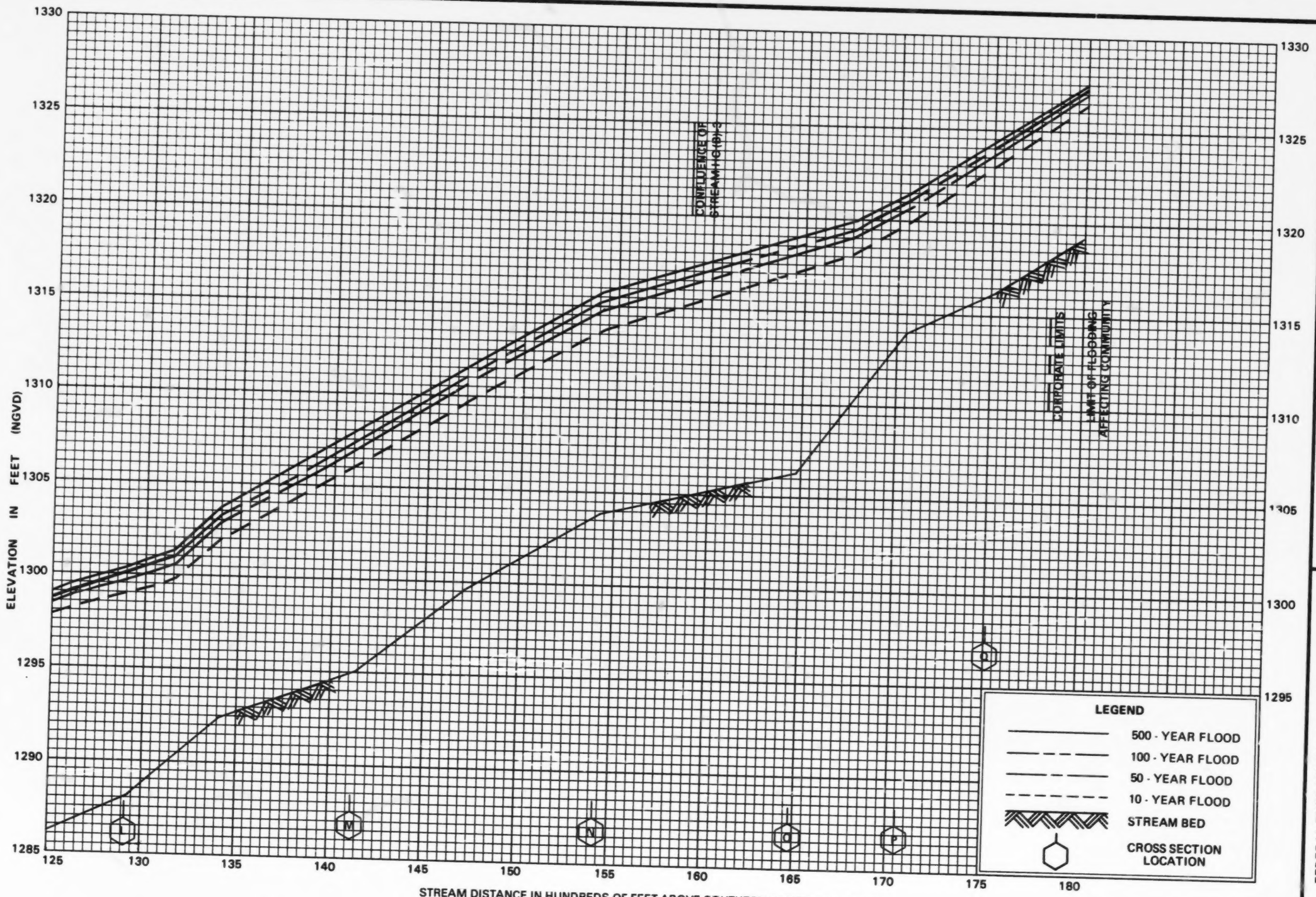

FLOOD PROFILES

HAMILTON CREEK

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(BURNET CO.)

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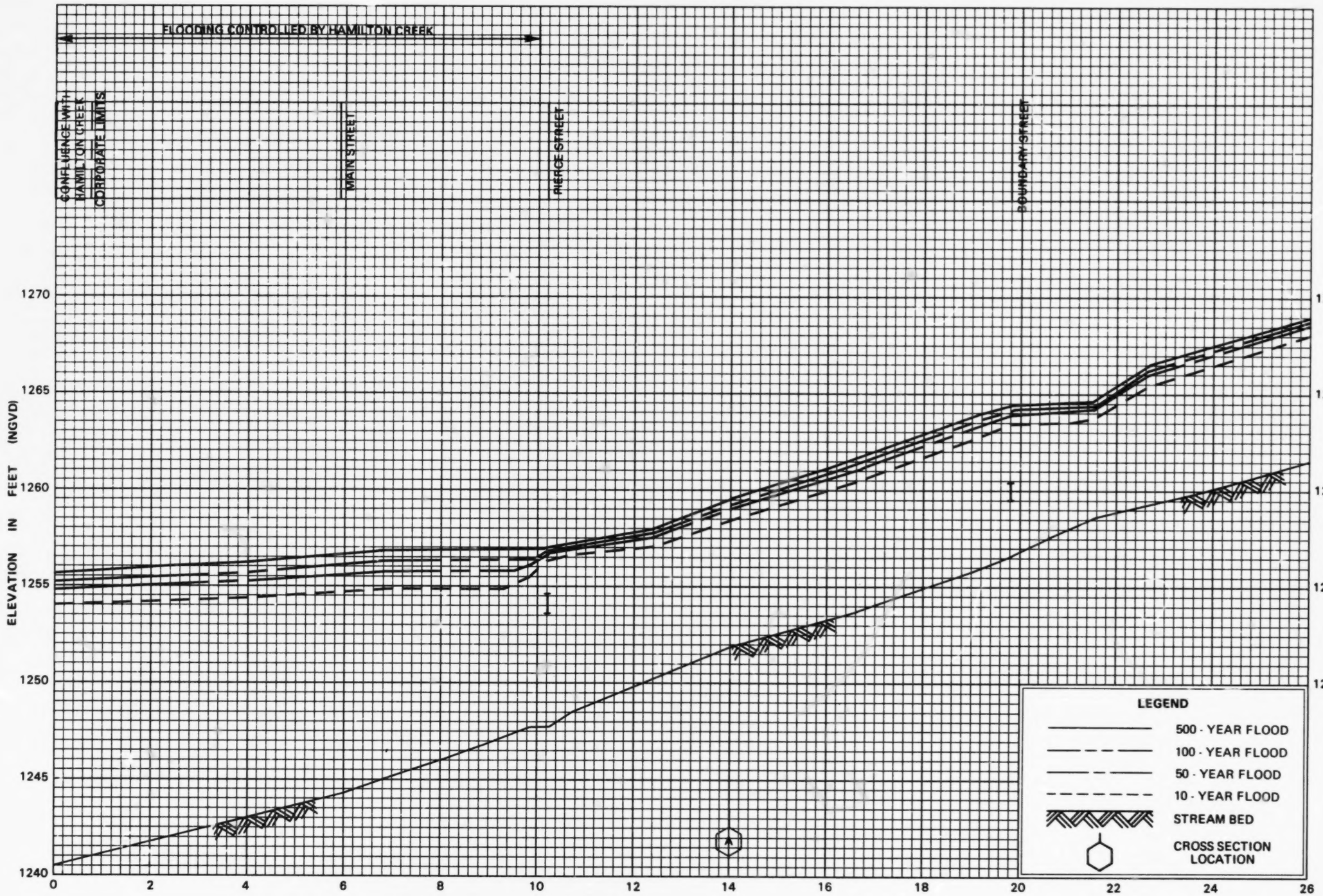

FLOOD PROFILES

HAYNIE BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX
(BURNET CO.)

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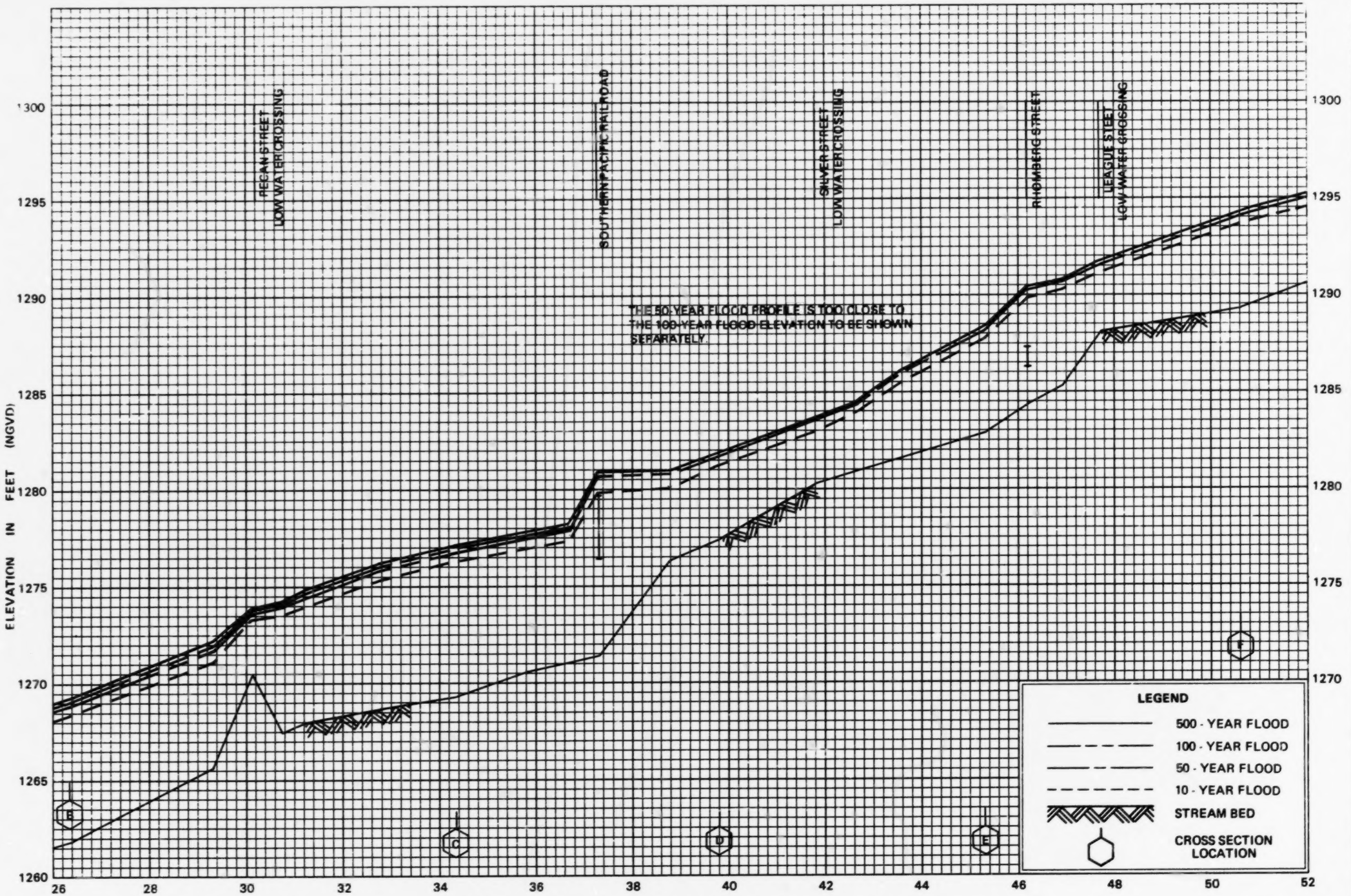

FLOOD PROFILES

HAYNIE BRANCH

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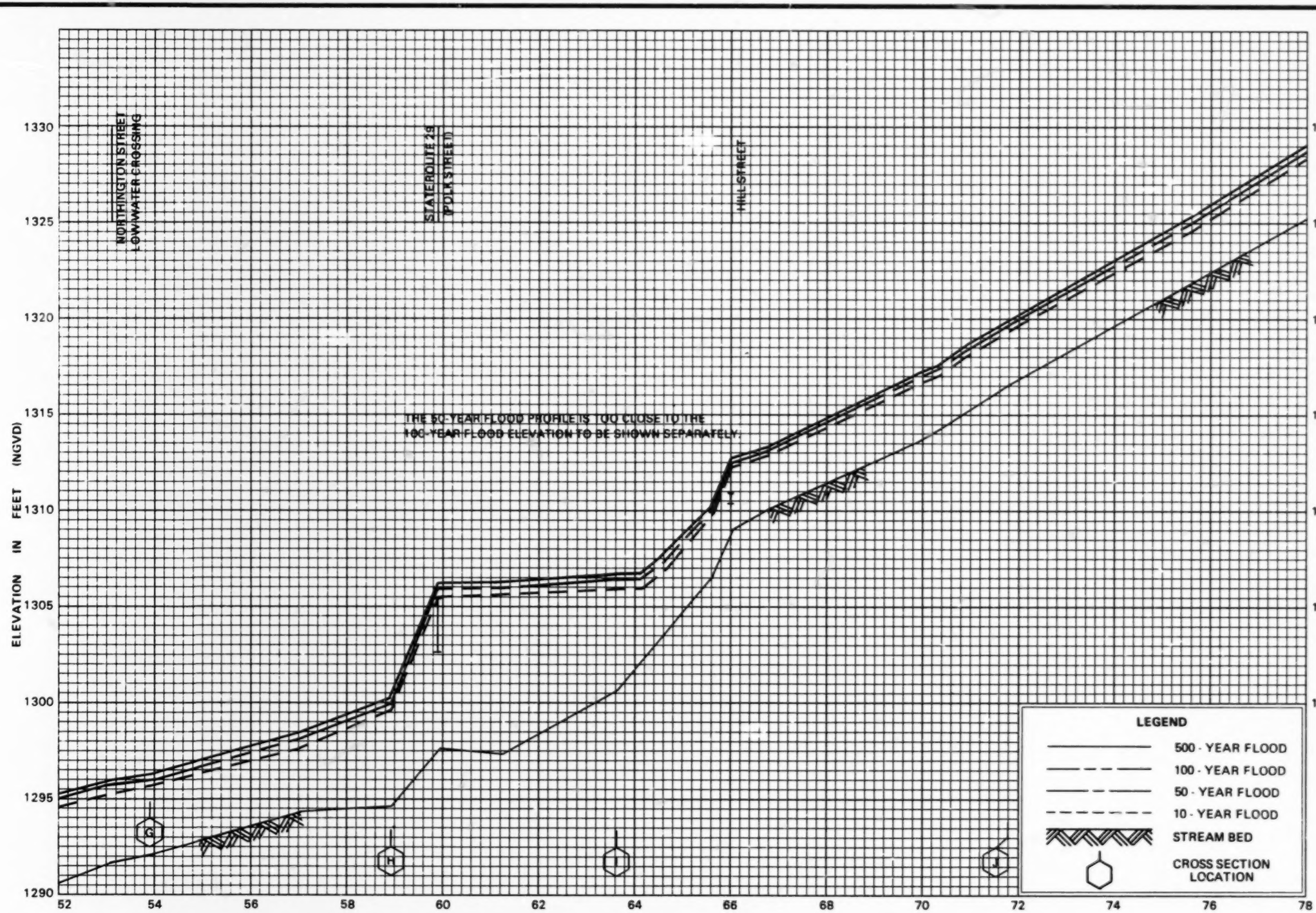

FLOOD PROFILES

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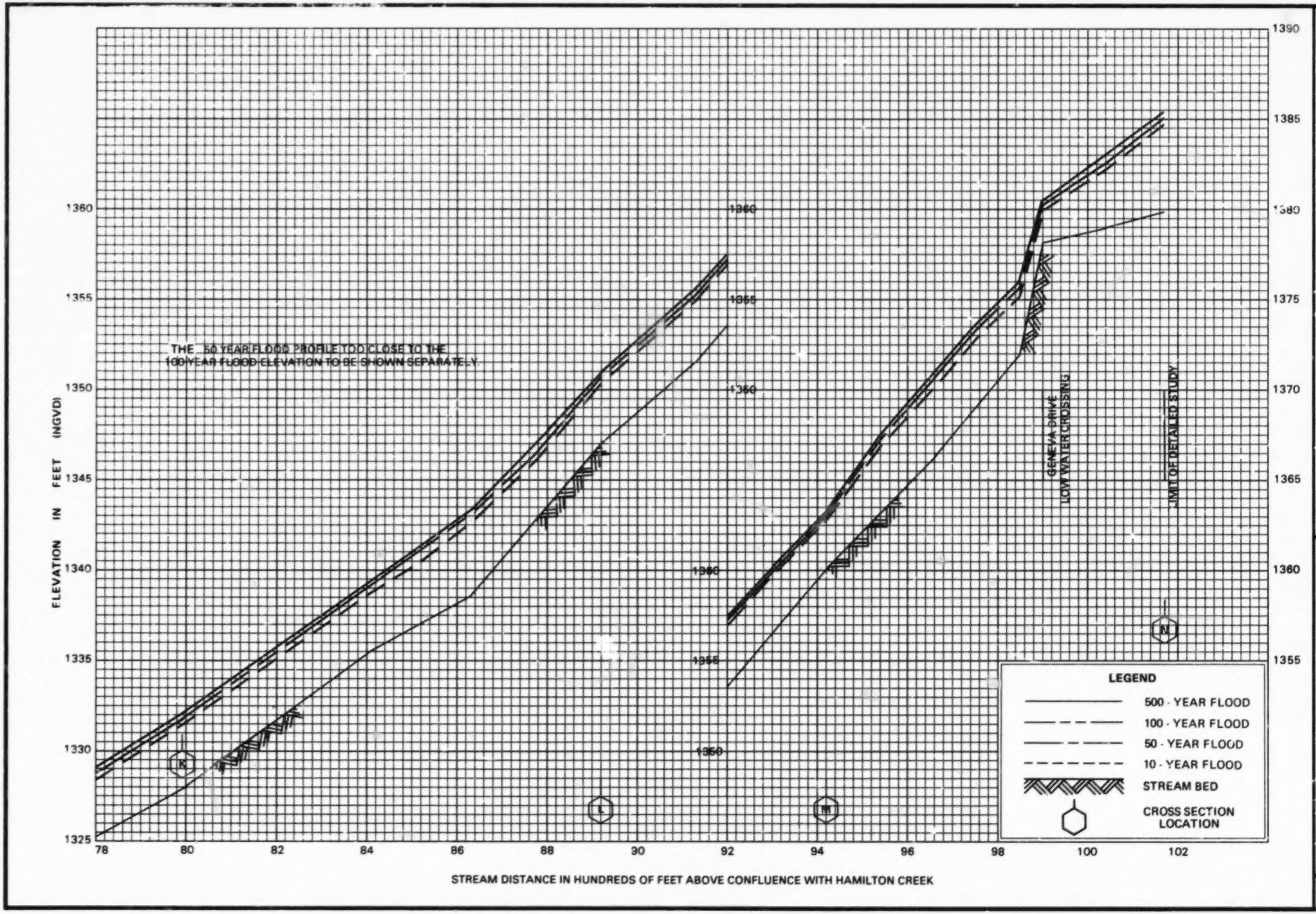

FLOOD PROFILES

HAYNIE BRANCH

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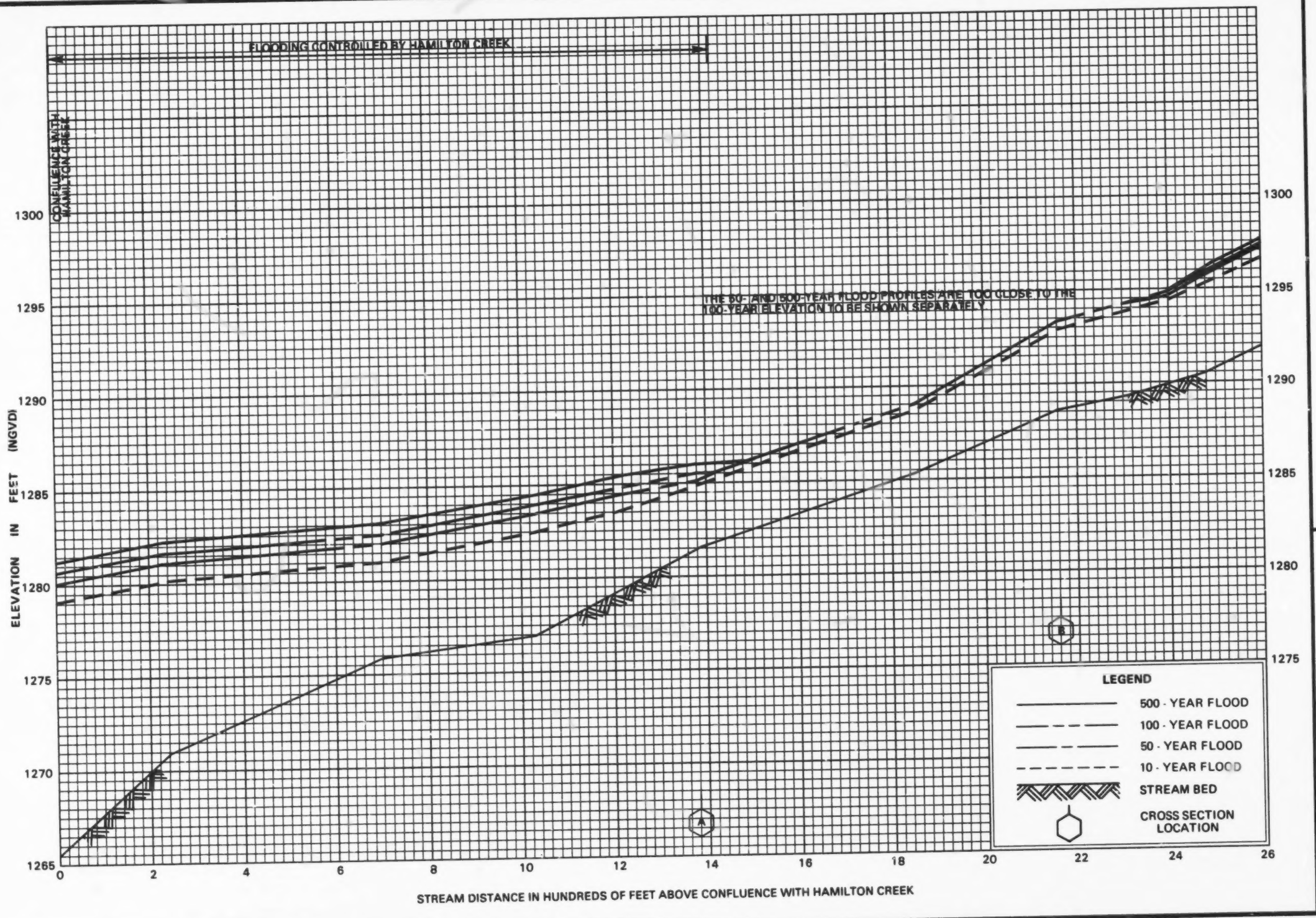

FLOOD PROFILES

STREAM HC(B)-2

FEDERAL EMERGENCY MANAGEMENT AGENCY

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(BURNET CO.)

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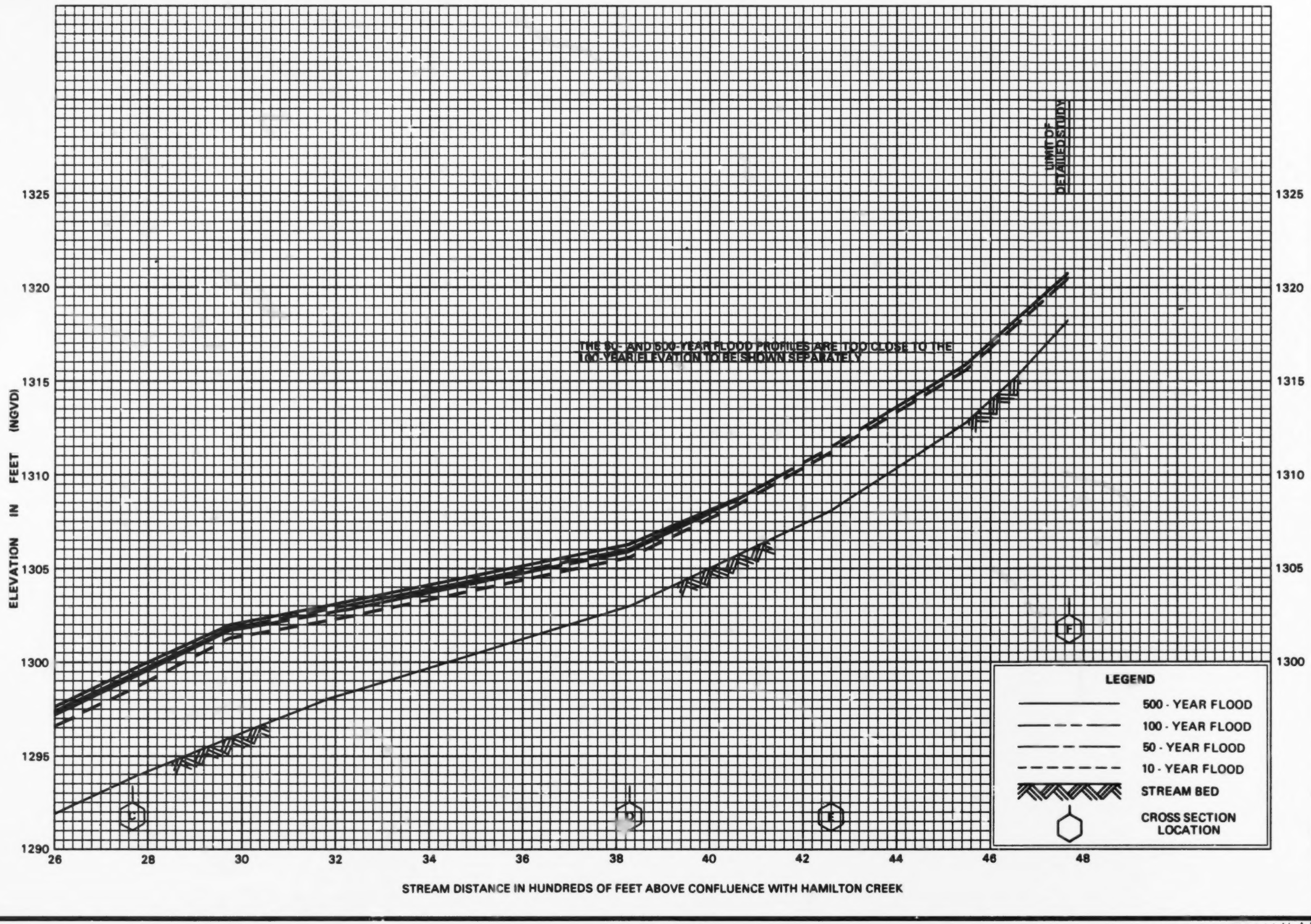

FLOOD PROFILES

STREAM HC(B)-2

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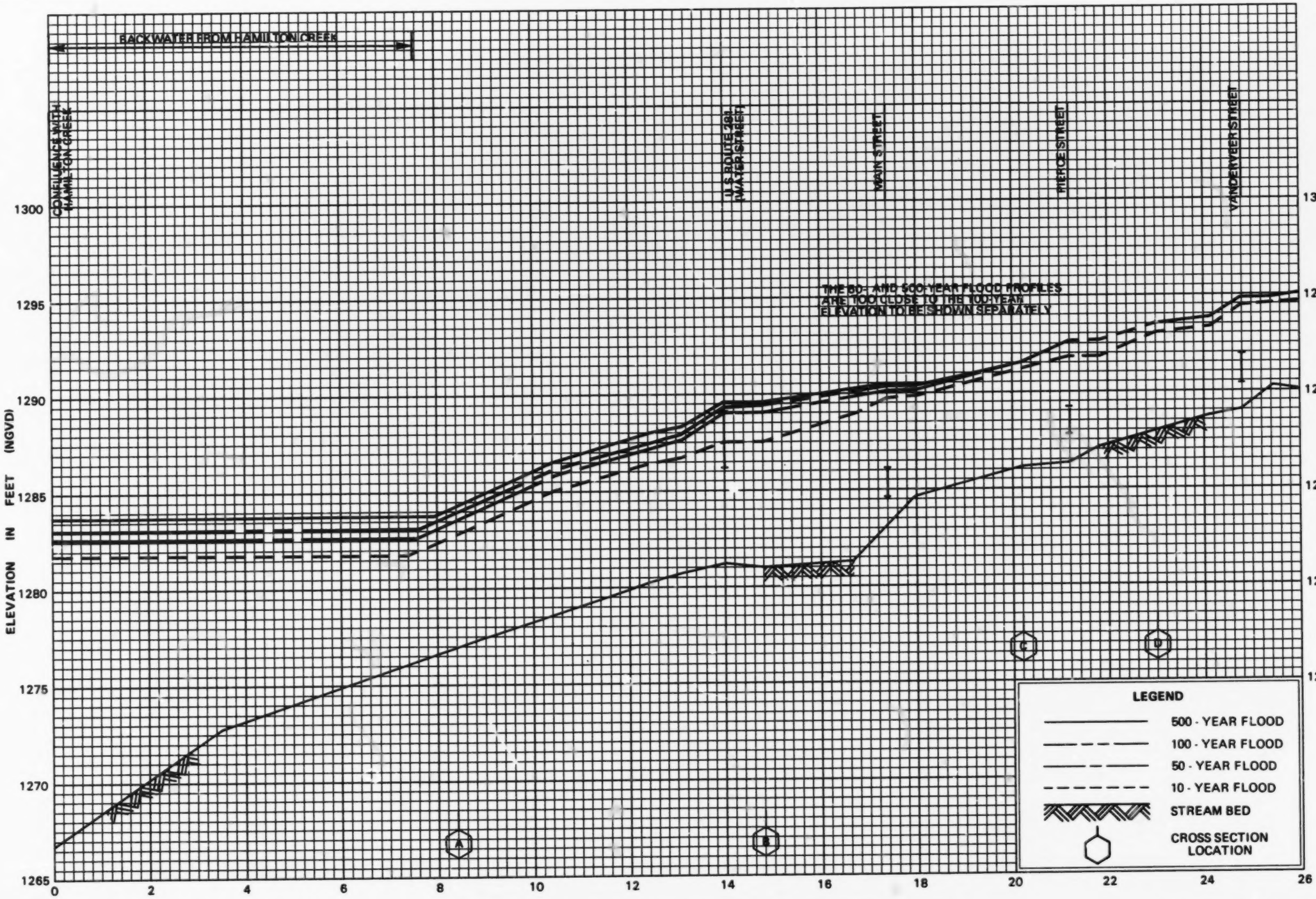

FLOOD PROFILES

DAUGHERTY BRANCH

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CITY OF BURNET, TX
(BURNET CO.)

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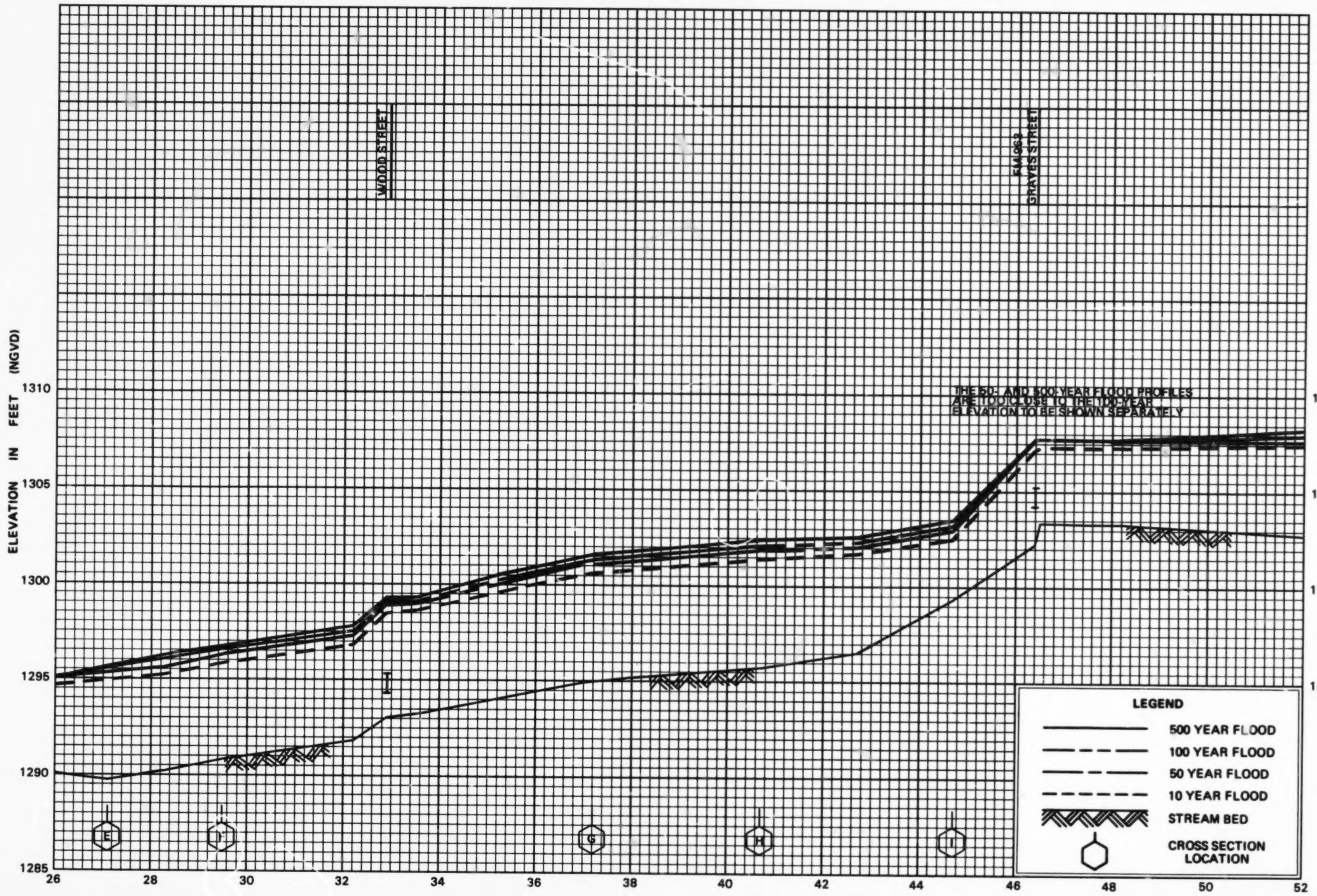

FLOOD PROFILES

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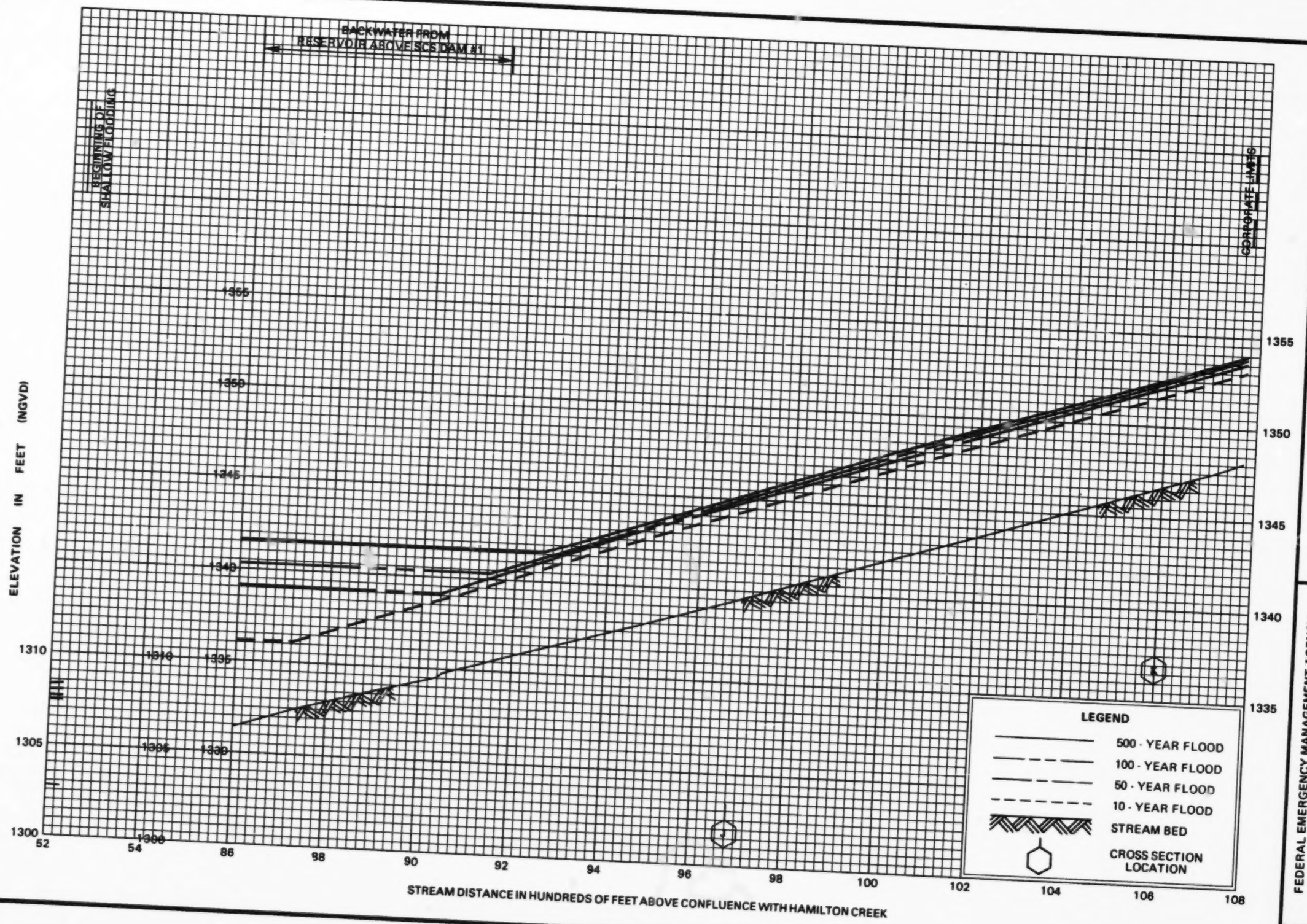

FLOOD PROFILES

DAUGHERTY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF BURNET, TX

(BURNET CO.)

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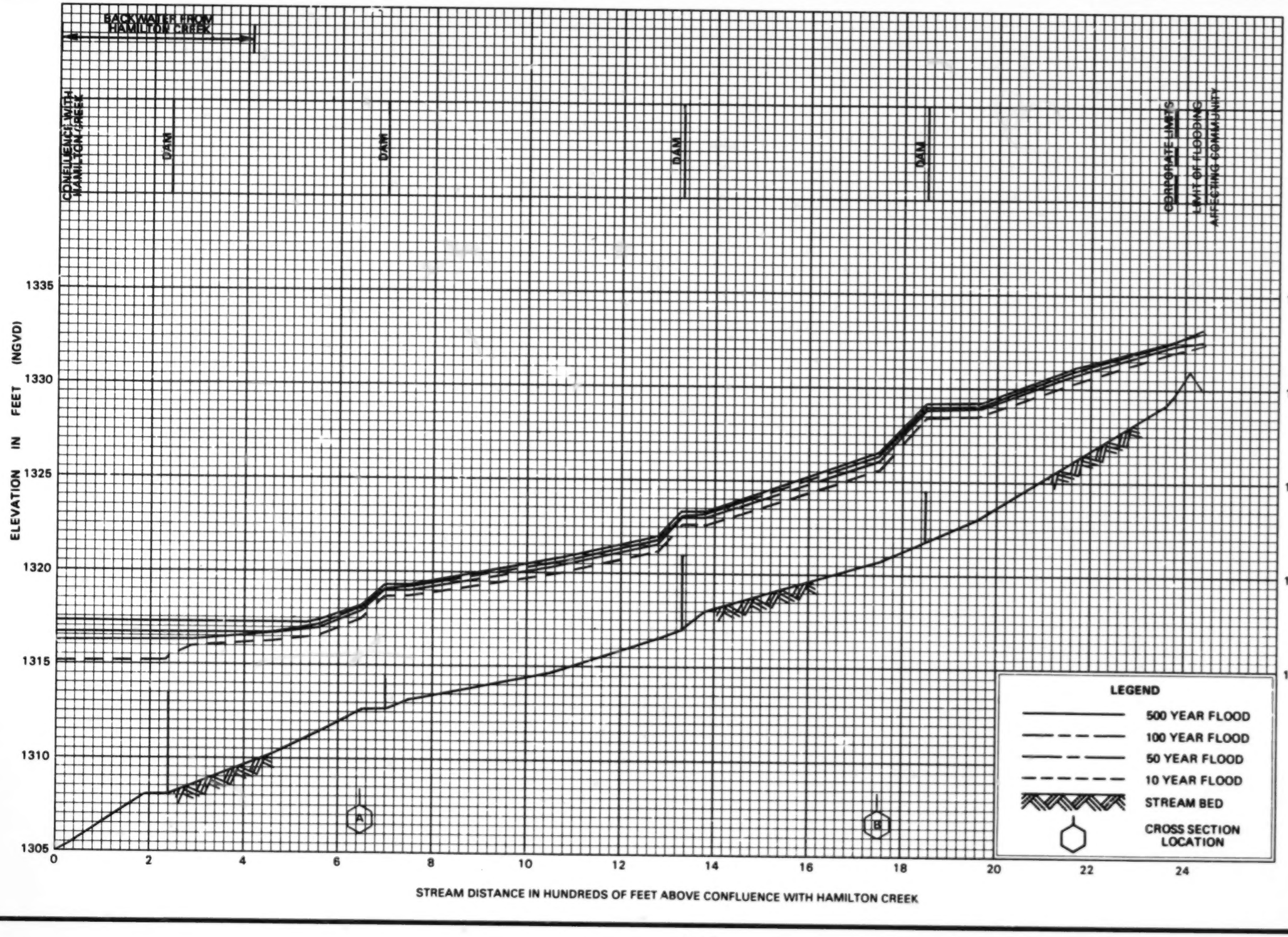

FLOOD PROFILES

STREAM HC(B)-3

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CITY OF BURNET, TX
(BURNET CO.)

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